REMARKS

Claims 1-20 are pending in the application. Claims 1-20 are rejected. Reconsideration of the claims is respectfully requested. No new subject matter has been added.

Claim Rejections - 35 U.S.C. § 112

Claims 1 and 16 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner states that the limitation non-overlapping was not described in the specification. This rejection is respectfully traversed.

FIG. 4 of the present application clearly show non-overlapping PN-codes 52 and 50. FIG. 9 of the present application clearly shows PN-codes 144 and 146 that are non-overlapping. Further, the specification starting at page 6, line 8, describes the transmitter circuitry 62 that generates non-overlapping PN codes. Refer the specification starting at page 6, lines 22. Only serial non-overlapping PN codes can be generated from the exclusive-OR circuit 36. However, to further prosecution, the term "non-overlapping" has been removed from claims 1 and 16. Therefore, the rejection of claims 1 and 16 under 35 U.S.C. § 112, first paragraph is moot.

Claim 13 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13 has been amended to provide adequate antecedent basis. According, claim 13 is allowable under 35 U.S.C. § 112.

Claim Rejections - 35 U.S.C. § 102 and 35 U.S.C. § 103

Claims 1-3, 6-9, 13, 14 and 16 are rejected under 35 USC § 102(b) as being anticipated by Raphaeli (U.S. Publication No. 2004/0202229). Claims 1, 10, 15, 17, 18, 19,

20 are rejected under 35 U.S.C. §103(a) as being upatentable over Van Driest (U.S. Patent No. 6,115,411).

<u>Providing High Spread Spectrum Correlation While Inserting Time Gaps Between Spread Spectrum Codes</u>

Claim 1 has been amended to recite:

a slip encoder configured to encode other data values into the encoded data stream by varying time spacing between the spread spectrum codes, wherein the other data values correspond to an amount of clock periods inserted by the slip encoder between the generation of adjacent spread spectrum codes so that generation of every first entire spread spectrum code is completed and then a time gap with no spread spectrum code is inserted before starting generation of every second adjacent spread spectrum code, where the time gap between ending every first spread spectrum code and beginning every second adjacent spread spectrum code is proportional to one of the other data values and a time delay position in completing transmission of every entire second adjacent spread spectrum code corresponds to the time gap.

This is clearly shown in FIG. 4 where transmission of a first entire spread spectrum code 52 is completed and then a time gap 54 with no spread spectrum code is inserted before starting generation of a second adjacent spread spectrum code 50. The time gap 54 between ending the first spread spectrum code 52 and beginning the second adjacent spread spectrum code 50 is proportional to one of the other data values (page 5, lines 9-12). A time delay position 56 shown in FIG. 4 in completing transmission of the entire second adjacent spread spectrum code 50 corresponds to the one of the other data values 0-F in FIG. 4.

As explained in the specification starting at page 4, line 25, claim 1 takes advantage of the strong correlation properties of a spread spectrum scheme to first allow precise

detection of PN-codes and then to use that precise detection to also encode additional data into a transmission gap inserted between adjacent PN-codes.

Claim 1 recites a slip encoder that varies time spacing between the entire transmitted spread spectrum codes. This allows an entire first spread spectrum code to be generated without interference and further allows precise detection of adjacent spread spectrum codes by a receiver. In other words, by transmitting an entire spread spectrum code, all 64 bits of a 64 bit PN-code can be used for correlation by the receiver. This allows the receiver to more precisely identify the beginning and end of each spread spectrum code transmission. If the spread spectrum codes where overlapped as described in Van Driest, correlation by the receiver would be less reliable and result more data transmission failures.

Claim 1 further recites the time gap being proportional to a time delay position in completing transmission of the entire second adjacent spread spectrum code. This again is shown in FIG. 4 of the present application where the end of the second PN-code 50 is proportional to the slip time 54.

More precise correlation of the first and second spread spectrum codes are possible because the entire spread spectrum codes are transmitted without overlap. This in turn allows more precise detection of the amount of time gap 54 in FIG. 4 inserted between that adjacent spread spectrum codes.

Neither Raphaeli nor Van Driest insert time gaps in between adjacent spread spectrum codes that are not part of the spread spectrum codes. The Examiner states that Raphaeli in FIGS. 1 and 14 and paragraphs 33 and 41 teaches a spread spectrum encoder as recited in claim 1. However, nowhere in paragraphs 33 and 41 does Raphaeli mention inserting a time gap after the end of a first spread spectrum code and before the beginning of a second adjacent spread spectrum code as recited in claim 1.

Conversely, Raphaeli at paragraph 33 discusses a synchronization sequence that includes a plurality of symbols with predefined time gaps between EACH of the symbols and is transmitted at the beginning of each packet. There is no teaching of inserting a delay between the entire adjacent spread spectrum codes as recited in claim 1.

Further, there is nothing in paragraph 33 or paragraph 44 that suggests that the time gap in Raphaeli is proportional to the other data values different from the data values associated with the spread spectrum codes as recited in claim 1.

The Examiner acknowledges that Van Driest does not specifically teach a slip encoder configured to encode other data values into the encoded data stream by varying time spacing between the spread spectrum codes. However, the Examiner states that Van Driest discloses a variable rate symbol generator that includes an extension of information bits per symbol as Barker codes. The Examiner states that adding these Barker code extensions of sequences and filling or inserting of gaps between PN sequences have the same function as claim 1. This is respectfully traversed.

Van Driest overlaps at least portions of consecutive 11-chip barker sequences in both an I channel and a Q channel (col. 6, lines 1-4; col. 8, lines 5-8). Van Driest loses correlation precision by sacrificing overlapping chip values. This is exactly one of the problems that claim 1 avoids, namely, giving up correlation precision for additional bandwidth. Van Driest even acknowledges the problem created by simultaneously transmitting at least portions of adjacent Barker sequences (see col. 8, lines 5-21).

Please refer to FIGS. 4 and 5 where the barker sequences 1, 2 and 3 are generated by delaying which chip positions are associated with the center lobes 401-403. This encoding scheme intentionally sacrifices some for the transmitted chip values in order to move the barker codes within a fixed reference time frame (col. 6, lines 59).

There are no gaps inserted anywhere between the adjacent Barker codes in Van Driest similar to the time gaps specified in claim 1. Only the center of the barker sequences are shifted.

Claim 1 avoids the problems that exist with Differential Code Shift Keying (DCSK) by inserting time gaps between entire spread spectrum codes when no other spread spectrum codes are being transmitted. As a result, all of the available chips in each adjacent spread spectrum code can be fully correlated by the receiver. This again allows more reliable spread spectrum code transmissions and further allows the amount of time gap inserted between the adjacent spread spectrum codes to be more accurately determined. Accordingly, the addition data associated with the inserted time gaps can also be more reliably transmitted.

Accordingly, claim 1 is patentable under 35 USC § 102(b) over Raphaeli and also patentable under 35 U.S.C. §103(a) over Van Driest. Claims 9 and 16 include limitations similar to claim 1 and therefore are patentable for the same reasons.

Claim 2 recites a spread spectrum encoder configured to encode data values with one or more spread spectrum codes and generate a corresponding spread spectrum encoded data stream; and a slip encoder configured to encode other data values into the encoded data stream by varying time spacing between the spread spectrum codes, wherein the slip encoder includes a slip counter that delays the spread spectrum encoder from transmitting spread spectrum codes for a number of clock periods corresponding with associated data values.

Reducing Time Gaps Required For Representing Data Values

The amount of time gap inserted between adjacent spread spectrum codes is proportion to the data value represented by the time gap. For example, as shown in 4, a data value of 0 is associated with no delay between PN-code 50 and 52. Conversely, the largest

other data value F (1111 binary) is associated with the longest delay of 15 delay units between PN-Codes 50 and 52.

The specification on page 11 and FIG. 9 explain how the amount of delay units required to represent large numbers is reduced. A bit comparator and inverter 93 in FIG. 7 detect any four bits data values above some threshold. The bits for any data values greater than the threshold value are then inverted. This bit inversion reduces the value associated with the original bits. This allows a smaller time gap associated with the inverted bits to be used in between the adjacent PN-codes. A bit in header 140 of FIG. 9 is then set to notify the receiver that bits associated with the time gap should be re-inverted. Thus, a higher bandwidth is achieved using the same time gap scheme.

This is recited in claims 7 which recites: An encoder, comprising:

a spread spectrum encoder configured to encode data values with one or more spread spectrum codes and generate a corresponding spread spectrum encoded data stream; ~~and~~

a slip encoder configured to encode other data values into the encoded data stream by varying time spacing between the spread spectrum codes; and

a data inverter converting a sequence of bits representing selected data values into lesser inverted data values, the slip encoder varying the spacing between some spread spectrum codes according to the inverted data values.

Claim 8 further recites a header in the encoded data stream identifies the inverted data values so that the converted sequence of bits still represent the same selected data values while reducing the time spacing between the spread spectrum codes representing the selected data values.

The Examiner has cited Raphaeli FIG. 2, item 40 as suggesting the limitations of claim 7 and 8. However, the correlator 40 in FIG. 2 of Raphaeli is not *a data inverter converting a sequence of bits representing selected data values into lesser inverted data*

values, the slip encoder varying the spacing between some spread spectrum codes according to the inverted data values as recited in claim 7.

The correlator 40 in Raphaeli simply correlates the output of a shift register with a spreading waveform pattern (paragraph 56). The correlator 40 in Raphaeli does not convert selected data values into lesser inverted data values as recited in claim 7. And the correlator 40 in Raphaeli certainly does not then identify the inverted data values in a header so that the converted sequence of bits still represent the same selected data values while reducing the time spacing between the spread spectrum codes representing the selected data values as recited in claim 8.

Accordingly, claims 7 and 8 are allowable under 35 USC § 102(b) over Raphaeli.

CONCLUSION

For the foregoing reasons, reconsideration and allowance of claims 1-20 of the application as amended is requested. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

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